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Translation of "Budet li vstrecha s inym razumom?"
Ogonek, No. 42, 13 October 1973, pp. 24-26

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16. Abstract

Lev Mironovich Gindilis, a participant in the 1971 CETI conference (Byurakan), Senior Research Associate of the State Astronomical Institute im. P. K. Shternberg, and Academic Secretary of the Section on the "Search for Space Signals from Artificial Sources" of the Scientific Council on Radioastronomy, USSR Academy of Sciences, and Boris Nikolayevich Panovkin, Senior Research Associate of the same Council, were interviewed on the question of communication with extraterrestrial civilizations.

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WILL THERE BE A MEETING WITH OTHER INTELLIGENT BEINGS?

D. Bol'shov, L. M. Gindilis, and B. N. Panovkin

Club of Unsolved Mysteries /24*

Extraterrestrial civilizations ...? Many believe that the discussion this problem is allowable only on the pages of science fiction novels. Here, they say, there can be no idea of a serious scientific discussion. In fact, this is all the realm of speculation.

However, it appears this way only at first glance. Actually, eminent astronomers, physicists, mathematicians and philosophers have long labored over this, it would appear, fantastic problem. Scientists have devoted no small number of profound investigations to elucidating it, have conducted complicated experiments, and have discussed many of its aspects at scientific societies and symposia.

Whereas several years ago hypotheses on the existence of extraterrestrial civilizations were often highly naive and derived from some subconscious striving of people, as noted by Academician V. G. Fesenkov, to feel that they were not alone on their tiny little earth in the boundless space of the universe, but now the possibility of advancing to a thorough study of the problem has been opened up, which also presupposes the experimental testing of hypotheses.

In 1964 the first All-Union Conference on Problems of Communications with Extraterrestrial Civilizations -- EC as they are referred to in brief by scientists -- was held at a scientific

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* Numbers in the margin indicate pagination in the foreign text.

center as important as the Byurakan Astrophysical Observatory, in the Soviet Union. The conference decided that the problem of establishing communications with EC "is a quite mature, urgent scientific problem."

And in September 1971, on the initiative of the USSR Academy of Sciences, the first International Conference on Problems of Communications with EC was held at the very same Byurakan Astrophysical Observatory. The conference was organized by the USSR Academy of Sciences, the Armenian SSR Academy of Sciences and the United States National Academy of Sciences. Scientists from many countries participated.

Today at the session of our club of unsolved mysteries we have invited a senior staff co-worker of the State Astronomical Institute imeni P. K. Shternberg, Candidate of Physico-mathematical Sciences, Lev Mironovich Gindilis, learned secretary of the section "Search of Cosmic Signals of Artificial Origin" of the Scientific Council on Radio Astronomy of the USSR Academy of Sciences, and Boris Nikolayevich Panovkin, senior scientific co-worker of this same council and Candidate of Physico-mathematical Sciences.

CORRESDONDENT. Lev Mironovich, you were a participant at the Byurakan conference. Would you tell us, please, about its work.

L. GINDILIS. The conference was quite interdisciplinary in its character. You could meet astronomers, physicists, biologists, anthropologists, historians, sociologists, philosophers, specialists in cybernetics, information theory, and communications. The conference concluded that the "prospects of contact with EC are favorable enough to justify launching into a number of well-prepared search programs."

The official name of the conference was "Communications with Extraterrestrial Intelligence" (in short, CETI). Today, this term is continually entering into use as the name for a scientific direction lying at the frontier of the most diverse sciences.

CORRESPONDENT. The practical aspect of this new direction is of interest. Not in the utilitarian-applied sense, but still from the standpoint of scientific-practical significance of the results of studies and their culmination, if we have in mind by "culmination" achieving Contact.

L. GINDILIS. First of all, we must note that even if EC will not be detected, the actual searching for them doubtless will lead to the discovery of many interesting astronomical phenomena, which unquestionably will promote an expansion of human understanding. In fact already formulation of this problem led to the necessity of revising our concepts of the regularities of the emergence and development of life, of the concepts "living," "intelligent," and "artificial," and on regularities of further avenues along which our civilization will develop.

A highly valuable aspect of the investigations is the fact that, by attempting to establish contact with other worlds, we can look at ourselves and on earth as if "from the outside." This view from the outside is very useful.

But if contact with EC at some time will be achieved, this doubtless will have a strong influence on humanity. The most profound consequences of this contact will probably not become evident at once: a fairly long time will elapse. It is impossible to imagine the specific nature of these consequences, but there can be no doubt that ultimately they will have a revolutionary effect on humanity.

The problem of utilizing the results of contact by the social system that succeeds first to achieve this will also be fundamental. This is an urgent question. The history of scientific discoveries, especially in recent years, soberly warns us that humanity is obligated to be ready to deal quite maturely with the possible "surprises" that can be encountered when the problems of communications with extraterrestrial intelligence are solved. This in fact is only one of the practical aspects of the large and extensive search of EC. Here, just as in the efforts to master outer space or in controlling pollution of our environment, broad international cooperation would be highly useful.

B. PANOVKIN. Yes, unquestionably, the thesis of the effect on ourselves "from the outside" is highly valuable. But also important is a close view of history. It must enrich science and our concepts of the development of the practical activity of intelligent creatures, and therefore, also the nature and specific details of their cognitive activity which can differ essentially from ours. So the necessity arises to generalize the results of studies on the development of various civilizations on the earth, and to study general regularities of biological evolution and new problems in the theory of cognition.

We must not believe ourselves to be the only specimen, the only scale. In fact there may also be other highly organized systems capable of understanding the world around them.

L. GINDILIS. In this respect experiments on establishing contact with other biological species on earth are of great value. Of particular interest is the effort to achieve contact with dolphins, which "aspire" to the role of an intelligent species. The theory of cognition must provide very broad generalizations in this direction dealing with the relations between the perceiving system (biological or nonbiological) and the surrounding world.

CORRESPONDENT. Foreign futurology includes the version that civilizations which in their development attain the abilities to populate near outer space, for example, the planetary system that they are part of, have no more than 50 years left to live. They apparently "suffocate" from their own technological perfection -- irreversible processes begin in their environment primarily because of contamination, processes that will lead to the inevitable destruction if not of all life, then in any case of all intelligent life.

L. GINDILIS. We do not believe so. We do not agree with this thesis. Another case: one must not completely brush aside the problem of the "finitude" of the life of the civilization. Even if one believes that a civilization will prove capable of preventing dangerous processes in its environment and overcome its own internal crises, still the prospect of the possible span of its existence must be investigated.

CORRESPONDENT. Even F. Engels in "Introduction" and in "Dialectics of Nature" wrote that in the eternal cycle in which matter moves, the time of organic life and even more so the lifetime of creatures that are aware of themselves and of nature is vanishingly brief. Here, of course, we are talking about the cycle of matter in which, in Engels' words, our earth year cannot serve as an adequate unit of measurement, about the millions of years during which natural changes could have occurred, for example, in the temperature of our sun. But, being a great dialectician, Engels did not regard these changes in living conditions in one of the corners of the universe as the prelude to a universal destruction. He confidently emphasized that in all its transformations matter remains eternally the same, therefore life can never be completely wiped out. And it is in this assertion that the optimism of materialist dialectics lies.

L. GINDILIS. The life span of a civilization unquestionably /25
is directly related to the probability of contacting intelligent creatures of other worlds. But our interest lies not only in this.

Let us assume that a civilization capable of sending us a signal can exist as long as it wishes. So here one does not deny the genuineness of the assumption that this civilization must at some stage of its development limit its penetration into space. It can, for example, conclude that there is no practical value of unbounded migration, in spite of the technical capabilities of sending its representative or automata quite far. Since the speed of light is the limiting quantity to the speed of interaction, it is quite logical to assume that breaking up a civilization into parts whose coordination will become virtually impossible owing to the enormous distances between them, let us say, several light years, will prove to be wholly inexpedient. The romantic appeal of ever-spreading penetration into infinity retreats before a more practical approach to the matter. In fact, this turn of events can also not be precluded. But it reduces the probability of contact even without any curtailment of the lifespan of a civilization.

CORRESPONDENT. But does not the fact that the speed of interaction, however great it may be, is still a finite value significantly hinder exchange also between those civilizations which do not at all intend to restrict their penetration into outer space?

L. GINDILIS. Actually, according to our present concepts, there is no interaction, no exchange in nature at a speed that exceeds the speed of light. This imposes certain restrictions on contact, for example, in the form of mutual visits. Imagine to yourself that the nearest civilization lies at a distance of 1000 light years from the sun. Would imported information be of

interest to a new society? Would answers to questions posed by the society's remote ancestors be of interest to the society?

CORRESPONDENT. Do these restrictions extend also to other methods of communications?

L. GINDILIS. The point is that at the present time we know of only one suitable channel of communications -- electromagnetic waves. Naturally, a question arises: may other channels of communications exist based on laws of nature thus far unknown to us? It would be at the very least incautious to deny this possilibility. One cannot suppose that today all the laws of nature have been discovered. Based on what we know today, whether it pleases us or not, we must recognize that contacts between civilizations can only be one-way.

CORRESPONDENT. Scientists state that the universe is evolving, that at some time "earlier" it was not what it is today, that there were not only stellar clusters, but even the stars and matter were in the universe in a different state. Our conversation will become very complicated if we attempt here to formulate even a few of the aspects of this highly complex problem of the structure of space, the present understanding of the finitude and infinitude of the universe, and its development in time. But let us state one thing: since the universe is evolving and developing, this means that at one time it was different. And that there was no life in it. Furthermore, it was compressed, in fact even to barely "visible" dimensions. And here questions spring up: does this mean that "at one time" there was no life and intelligence in general? And if so, does this mean that our variant is the first, the unique variant?

B. PANOVKIN. There are some vague areas in your question. Of what universe are you speaking?

CORRESPONDENT. I really do need to narrow it down. I have in mind the part of the universe accessible to our investigations, let me put it more concretely -- our stellar system, our galaxy.

B. PANOVKIN. Everything depends on how a concept such as life is interpreted. Many in fact still limit their concept of life only to variants of what is known to us, based on earth conditions. However, modern science provides more sweeping generalizations. It is not fortuitous that in our conversation we have used the word "system." And not because we are trying to follow some "dry" logic capable of "devitalizing" as full-blooded a phenomenon as life and replacing it with some mechanized concept. It is simply that the very content of life proved to be much more complicated than had been earlier supposed. Accordingly, science then proposed new generalizations, in the light of which earth life (as a form of the existence of protein bodies) can be recorded as a special case.

F. Engels at one time wrote: "Our definition of life of course is highly inadequate, since it embraces far from all the phenomena of lift, but rather is limited to the most general and the most simple among them."

In the modern formulation of the question, life could be represented as some highly-stable and highly organized materal structure which is capable of exchanging energy, matter, and information with its immediate environment, assimilating substances obtained from without, rearranging them to resemble its own material structures, and in this way reproducing them many times. However, it is entirely probable that even this definition of life is not general enough. In principle then the ability of life to give rise to highly organized systems evidently must be classified as among its fundamental properties. It appears to me that the conclusion that these systems have "always" been born of matter

is quite justified, although Lev Mironovich does not agree with this point of view. These systems, or "life," as it appears to me, could have arisen on a material basis completely unknown to us and in forms which we are incapable of even imagining. Therefore, earth life can quite possibly be unique, as one of the forms of life, but the phenomenon itself, including intelligent life, must have very wide distribution. I recall that even F. Engels observed with the same iron necessity with which matter in all of its transformations will at some time destroy its highest flower -- the reasoning spirit -- on earth it must again give rise to it somewhere in another place and at another time.

CORRESPONDENT. More and more the writings of our scientists make reference to the fact that neither is the qualitative change in intelligent life, when it becomes artificial, to be precluded.

L. GINDILIS. Based on some "indicators," for example, the size of memory, artificial devices even now surpass man. Some of them exhibit the ability to be taught and to improve themselves. Scientists believe it quite reasonable that machines will be built that can design other, more advanced, self-teaching machines. But if the possibilities of modeling and carrying out functions are in no wise restricted to extremely highly organized matter, and this can already be regarded as proven by modern science, we are justified to foresee the enormous independence of thinking machines. Our scientists, for example, Corresponding Member of the USSR Academy of Sciences I. S. Shklovskiy, also does not preclude the possibility that the carriers of civilization can be artificial intelligent creatures. The same point of view is shared by the famed American cyberneticist, Professor M. Minsky.

CORRESPONDENT. These hypotheses do not mean, we must assume, that natural intelligence must be absorbed by artifical intelligence?

L. GINIDILIS. No, of course, we are speaking of the fact that the material basis for cognition need not necessarily at all be biological, which has been pointed out also by I. S. Shklovskiy. No, of course, as he emphasized, we cannot seriously discuss the question as to whether specifically artificial intelligence is of the very highest.

CORRESPONDENT. Then, you have in mind not some "conquest" of mankind by the robots created by it?

The assumptions of scientists in this respect deal not with the problem of the "battle of man" with the machines departing from his control, but the existence of a material basis of intelligence other than that known to us at present, including even artificial intelligence. Is this the point you are driving at?

L. GINIDILS. Yes, you are right, in this case we are speaking precisely about that.

CORRESPONDENT. Let us, however, return to the question of the barriers to contact with intelligent life on other worlds. Is contact possible with an object that even though material, but at the same time is such that we cannot "even imagine" it, even more unexpected than, for example, such a fantastic hypothesis as "life inside an electron?" Could we ever understand signals coming from "this close?"

L. GINDILIS. Yes, of course. If the problem is formulated in this way, if the signal is fundamentally incomprehensible, then it actually does not matter whether it was intended for internal needs or for the purpose of interstellar communications. But, if it is assumed that understanding in principle is possible, then the difference between two forms of signals about which I wish to speak becomes tangible.

An internal signal is not intended for deciphering by an unknown object. A signal specifically intended for contact is a different matter. In this case the transmitting-civilization strives to make it understandable. Therefore it evidently will try to furnish the tranmission with a kind of call letters containing the key for deciphering the entire text. Of course, I understand that a fundamental question remains: in general is the deciphering of a message from another civilization accessible to us, or are there some fundamental restrictions at work here?

CORRESPONDENT. We know of the example presented by F. Lem, and you referred to it earlier in your addresses. Here is the example. The message "Grandmother died, funeral Wednesday" is translatable into any human language. However, the difference between mother and father is unfamiliar to unisex creatures, and creatures capable of dividing, like the amoeba, have no concept of parent, even a unisex parent. This means that they would not understand the meaning of the word "grandmother." Immortal creatures (amoebas on dividing do not die) would not know the concepts "death" and "funeral." Therefore, they first would have to study the anatomy, physiology, evolution, history, daily life and habits of man before they could translate this telegram that is so clear for us.

Isn't it correct that this example affords us grounds for assuming that in spite of the practical difficulties of the task, we cannot completely deny our ability to understand a message of another civilization, all the more so if we are talking not about signals of some fantastic intelligence that lies somewhere "inside an electron."

In addition, as we know, science supposes that conditions for the development of life and intelligence similar to ours can exist in the universe. It refers to the presence near stars of planetary systems, and in these systems -- planets differing from

others by a combination of such "favorable" factors as suitable size and mass, distance from the star determining a temperature suitable for the development of life, the presence of a hydrosphere, and an atmosphere of a specific composition. Modern science also maintains that there are a great many planetary systems even in our galaxy, that is, in the cluster of stars "framed" by the Milky Way, at least several millions. Planets "favorable" for life will then be found among these systems!

We can, obviously, assume that in similar conditions intelligent creatures immerging in the course of evolution will encounter similar objective conditions of their daily life. For example, they will encounter liquid and will, therefore, study its properties; they will develop the concepts of circle, line, triangle, number, quantity and quality.

Ultimately their system of knowledge will reflect the same material world (not in the sense, of course, of specifically local conditions) as other systems of knowledge. Can in this case different (even though similar in a great many respects) conditions of existence lead to the fundamental impossibility of mutual comprehension?

L. GINDILIS. I assume that a "common language" must be found within the framework of the conditions you have outlined.

B. PANOVKIN. But here it is implicitly assumed that not only the laws of nature are identical in the universe, but also the laws of logic, essentially, are universal. I believe that there are several inacceptable simplifications in discussions of this kind. For example, it is implicitly assumed that a description of reality, an image of reality in the forms of schemes of scientific knowledge, and reality itself -- are all the same thing.

But the point lies not only in whether the very laws of nature are identical, but in how they are understood by different, diverse types of intelligence.

CORRESPONDENT. But does not this mean that you are admitting that there is a fundamental incomprehensibility of certain phenomena in the material world?

B. PANOVKIN. No, it does not mean that. To understand means to explain. But an explanation also consists in investigating the practical activity of other civilizations and interpreting it with "human" language using the concepts developed by our civilization. But to do this one must study the complex of concrete activity of these civilizations, including all their histories. These matters, however, are not learned about via radio telephone communications. /26

CORRESPONDENT. Well then, even if we will be able to deal with intelligent creatures developing in biophysical conditions similar to ours and having, therefore, similar daily habits?

B. PANOVKIN. Similar conditions do not necessarily give rise to similar daily practice. First of all, one must refine the concept "similar conditions." By this is usually meant some complex of starting-point initial conditions, which from our theoretical concepts gave rise to biogenesis on earth. We cannot state, however, that similar conditions in this respect are necessary and sufficient for even the protein form of life to emerge, or that from the similarity of initial conditions there follows the similarity of all the subsequent path of evolution.

As far as mutual comprehension is concerned, fundamental difficulties arise here, as I assume, not only in an attempt to establish contacts with "residents," let us say, within electrons.

If civilizations are unable to observe and compare the results of their practical activity one with the other, and it is precisely this situation that holds in the conditions of radio contact, then "translating from one language to another" is fundamentally impossible, for the basis of translation is a commonality of activity, of daily experience. But this is not a position of agnosticism, for we are speaking of the "barriers" of a purely practical sort.

L. GINDILIS. Here there are different points of view between us and Boris Nikolayevich.

First of all, if civilizations have built radio equipment and with it have sent signals, then there are already common elements in their activities. Further, it can be assumed that whatever be the mechanism with which intelligent creatures reflect objects of reality, at least several of the most essential features of the material world are in some fashion or other reflected in the process of cognition. It also appears that by virtue of the universal causation and causality of phenomena in the material world, at sufficiently high levels of abstraction a kind of mutual coincidence of concepts occurs. Finally, we can still assume that civilizations will be found that have a character of reasoning and a similar system of concepts as ours.

We must, of course, note here that the question of the language of contact, of deciphering and utilizing information obtained in signals of EC is a highly complicated issue. Its solution necessitates that we analyze in what fashion the representation of the world is formed in a highly organized system that perceives the world around, how concepts are formed, and how the model of the world around is constructed. Epistemiology solves these problems as related to human cognition. But when we are speaking of CETI here serious generalization are required, for we must talk not only of our own cognition, but of a broad

class of highly organized systems. It is probable that along with philosophy a broad cybernetic approach to the problem can prove highly fruitful here.

Thus ended our conversation, to put it more precisely, the recorded part of it. The participants did not set out to give the reader the unraveling of the as yet unsolved mystery of contact. In fact, this could not yet be done. Here we have only recounted several aspects of the current approach to this extremely complicated problem. As one can see, the points of views of even our two participants diverge significantly on a number of problems. It would be quite reasonable to expect that expanding the range of conversational participants would bring to light not only new hypotheses, but also new differences, new controversies. However, we did not wish to emphasize this. The important thing is that in our day this problem area is being discussed by scientists and is being discussed seriously. Much stated here will give rise to sharp controversies. B. N. Panovkin, for example, repeatedly during the course of our conversation emphasized that the problem of contact with other civilizations can be of only theoretical interest, as bearing definite world-view significance.

It is now still too early to evaluate which hypotheses will prove valid and which will be left behind in the course of investigations. Our readers, who are now younger than 50, will remember that, on reading the works of science fiction writers in their younger years, they almost never pondered over the specific-experimental aspects of manned flight or even unmanned flight into the region, for example, of Mars. But now, in any case, no longer do we think about, but are becoming contemporaries of these flights...